

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
3 February 2005 (03.02.2005)

PCT

(10) International Publication Number
WO 2005/010965 A2

(51) International Patent Classification⁷: **H01L 21/20**,
C30B 25/18

Vipavadee 42 Road, Bangkok, Thailand 10900 (TH).
DANNIELSON, David, T. [US/US]; 265 Elm Street, Apt. 3, Somerville, MA (US). **MICHEL, Jurgen** [DE/US]; 500 Summer Street, Arlington, MA 02474 (US). **KIMERLING, Lionel, C.** [US/US]; 369 Strawberry Hill Road, Concord, MA 01742 (US).

(21) International Application Number:
PCT/US2004/024747

(74) Agents: **CONNORS, Matthew** et al.; Gauthier & Connors LLP, 225 Franklin Street, Suite 3300, Boston, MA 02110 (US).

(22) International Filing Date: 29 July 2004 (29.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/491,378 31 July 2003 (31.07.2003) US

(71) Applicant (for all designated States except US): **MASSACHUSETTS INSTITUTE OF TECHNOLOGY** [US/US]; 77 Massachusetts Avenue, Cambridge, MA 02139 (US).

(72) Inventors; and

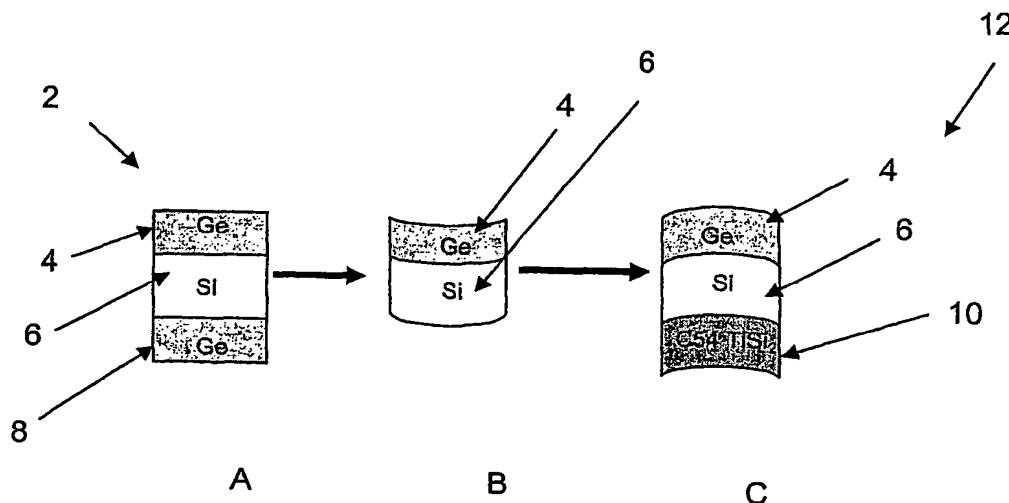
(75) Inventors/Applicants (for US only): **LIU, Jifeng** [CN/US]; 6 Bedford Street, Apt. 1R, Somerville, MA 02143 (US). **CANNON, Douglas, D.** [US/US]; 21 Calvin Street, Apt. 3, Somerville, MA 02143 (US). **WADA, Kazumi** [JP/US]; 23 Hill Street, Lexington, MA 02421 (US). **JONGTHANMANURAK, Samerkhea** [US/TH];

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,

[Continued on next page]

(54) Title: METHOD AND STRUCTURE OF STRAIN CONTROL OF SiGe BASED PHOTODETECTORS AND MODULATORS



WO 2005/010965 A2

(57) Abstract: A SiGe or Ge structure comprises a substrate and a SiGe or Ge layer that is formed on a first surface of the substrate. A silicidation or germanide layer is formed on a second surface of the substrate so to increase the tensile strain of the SiGe or Ge layer on the first surface.



SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

- *without international search report and to be republished upon receipt of that report*